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The Carriage of Staphylococcus aureus in the Milk and on the Teats of Normal Cows

by

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During the course of routine mastitis testing at this Field Station, haemolytic and non-haemolytic staphylococci have frequently been recovered from the teats and milk of cows which show no clinical abnormality of the udder. The presence of various types of staphylococci in milk has been recorded by numerous workers but little is known concerning the normal carriage of those organisms in or on the surface of the mammary gland. Minett (1936) showed that toxins produced from staphylococci isolated from normal milk were equivalent in potency to those produced by strains obtained from mastitis cases, and therefore, until more accurate methods of typing are available, it appears reasonable to assume that coagulase-positive haemolytic staphylococci isolated from the normal mammary gland are potential pathogens. Thus the presence of these organisms in or on the surface of the udder has an important bearing on the study of the epidemiology of staphylococcal mastitis.

The object of the work described in this paper was to determine:—

1. The number of cows in a normal dairy herd with pathogenic staphylococci in their milk.
2. The number of cows with pathogenic staphylococci on their teats.
3. The frequency of carriage and whether it was intermittent or persistent.

Animals Employed.—These comprised one Friesian and 38 Ayrshire cows, five years of age, all negative to the tuberculin test and free from infection with *Streptococcus agalactiae*. With the exception of two animals which had slight induration of one quarter and persistent clots in the milk, no animals in the herd showed clinical mastitis. *Staphylococcus aureus* was present in the milk of the two cows with indurated udders throughout the period of examination.

Technique of Milking.—Machine milking was practised with no hand stripping; each udder was cleaned with a sterile moistened cloth prior to the application of the teat cups. Between each cow the teat clusters were washed in water, disinfected with chloros solution (4 oz. to one gallon of water) and again immersed in water before being placed on the next cow.

Technique of Sampling.—The technique was similar to that described in the Report of the Imperial Bureau of Animal Health (1944). The milker, wearing rubber gloves which were rinsed in chloros before taking each sample, rubbed the base of each teat with a sterile swab moistened in water. Each swab was rotated in a McCartney bottle containing 10 ml. of sterile milk. The teat orifice was cleansed with a pledglet of cotton wool soaked in 50 per cent. alcohol, and the strip cup used in order to detect clots. Thereafter a McCartney bottle was filled with approximately 5 ml. of milk from each quarter. Samples were taken at intervals of 14 days from May, 1944 to November, 1944. Sampling was discontinued as each animal became dry.

Bacteriological Examination.—The teat swab and milk sample bottles were incubated at 37° C., the former for 24 hours and the latter for 48 hours. Thereafter one loopful (1 mm. in diameter) from each sample was streaked on the surface of ox blood agar medium. The plates were incubated overnight at 37° C. and those which showed evidence of definite haemolysis produced by colonies morphologically resembling *Staphylococcus aureus* were considered positive. In indefinite cases of haemolysis, films were stained by Gram's stain and the colonies were tested for coagulase activity by the tube test with rabbit plasma. As it is generally accepted that a close correlation exists between haemolysis and coagulase production, the former characteristic was considered to be sufficiently diagnostic for a preliminary survey of this nature. It may be mentioned that non-haemolytic orange staphylococci have also been isolated from this particular herd, but so far they have invariably proved to be coagulase-negative varieties.

RESULTS AND DISCUSSION

During a period of 24 weeks, 449 milk samples and 449 teat swabs were examined for the presence of *Staphylococcus aureus*; this organism was isolated from 85 milk samples and 57 teat swabs and the individual results are shown in Table I. Fig. 1 illustrates the number of positive milks and teat swabs obtained at each examination in relation to the number of animals sampled, and it will be observed that the milk rate varied from 2·9 to 25·6 per cent. and the teat rate from 2·6 to 28·2 per cent., thus giving a mean carrier rate of 18·9 per cent. in the former and 13·0 per cent. on the latter. This considerable variation in carriage could be expected in view of the work of Miles, Williams & Clayton-Cooper (1944) who, surveying the findings of other workers, showed that the presence of pathogenic staphylococci on the normal human body was subject to considerable variation, *viz.* 5 to 24 per cent. on the skin and 22 to 45 per cent. in the nose. Table II shows the relationship between positive teat swabbings and positive

FIG. 1.

THE CARRIAGE OF STAPHYLOCOCCUS AUREUS ON THE TEATS AND IN THE MILK OF NORMAL COWS.

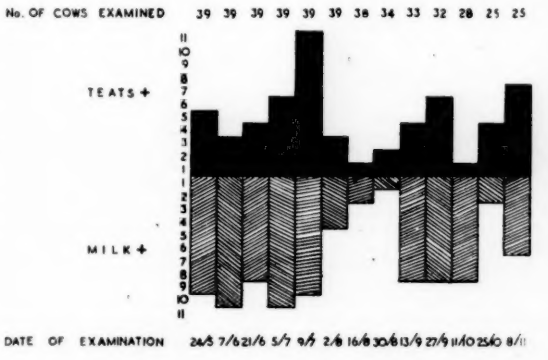

FIG. 2

CUMULATIVE PERCENTAGE INFECTION

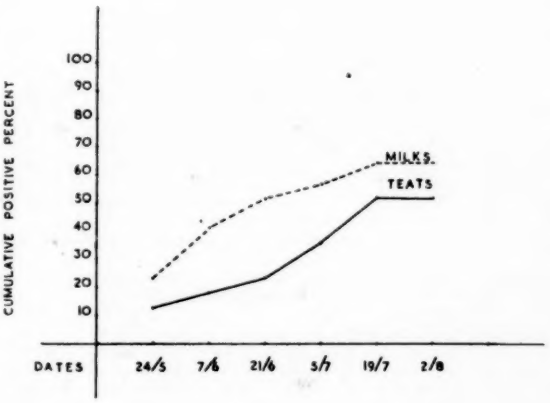

TABLE I

INDIVIDUAL MILK AND TEAT SWAB EXAMINATIONS

No. of Cow	Date of Examination																									
	24/5		7/6		21/6		5/7		19/7		2/8		16/8		30/8		13/9		27/9		11/10		25/10		8/11	
	T.	M.	T.	M.	T.	M.	T.	M.	T.	M.	T.	M.	T.	M.	T.	M.	T.	M.	T.	M.	T.	M.	T.	M.	T.	M.
2																										
3	+				+						+							+	+	+		+	+			
4									+	+												+		+		
5																										
7	+			+															+			+	+			
8				+						+				+	Died 6.9.45											
10		+					+	+	+																+	
11										+													Dry			
12									+																	
14		+																								+
16		+		+														+				+	+			+
17																										
18																									+	
21						+	+	+					+		+						Dry					
22		+		+			+	+		+								+		+					+	+
23				+					+																	
24																										
26							+	+	+										+				+			
27			+			+					+														+	
28																										
31		+								+										+		+				
32								+	+	+			Dry													
38										+		+					+	+								
41		+																		+		+	Dry			
42				+	+			+	+	+		+					+		Dry							
43	+			+														+		+					+	+
44	+			+		+		+				+		+		+	+	+	+	+	Dry					
45																										
46	+	+	+		+	+	+	+	+	+	+	+			+		+	+	+	+	+	+		+		
47																						+				+
18F		+		+	+	+		+	+																+	+
19F									+																+	
20F						+	+	+											+		Dry					
C 2			+	+		+															Dry					
C 4															Dry											
C 5						+			+						Dry											
C 6															Dry											
C 7															Dry											
C 8		+																+		+			Dry			

T. signifies teat swab. M. signifies milk sample. + signifies *Staphylococcus aureus* isolated.

milk samples for the 449 examinations and Fig. 2 indicates the cumulative positive samples over a period of six examinations for the 39 cows.

TABLE II

RELATIONSHIP BETWEEN POSITIVE MILK SAMPLES AND TEAT SWABS

	Total	Teat Swab Positive	Teat Swab Negative
Total ...	449	57	392
Milk sample positive ...	85	25	60
Milk sample negative...	364	32	332

It will be seen that, at the sixth examination, 64·1 per cent. of the cows had already been classified as milk-positive and 51·2 as teat-positive. *Staphylococcus aureus* was generally isolated at irregular intervals from the milk and teats of all the positive cows with the exception of two animals, Nos. 44 and 46, which appeared to be persistent carriers; the former harboured staphylococci on the teats on three occasions and in the milk on eight occasions, a total of ten examinations being made; the latter animal was examined 13 times and haemolytic staphylococci were isolated nine times from the milk and ten times from the teats. Moreover, a copious growth of staphylococcus was always obtained from both these cases whereas few colonies were observed in the majority of the other positive samples.

The milk and surface of the teats of only nine cows in the herd (23·1 per cent.) remained constantly free from *Staphylococcus aureus* during the total period of examination and therefore, considering the technique of milking employed in this particular herd, it may be assumed that many cows probably harbour haemolytic staphylococci in an intermittent manner in or on the surface of the udder. In different herds considerable variation in results might be expected depending on the method of milking, the general hygiene, and the technique of sampling; for example, it is possible that the carrier rate would be considerably higher in those dairies where hand-milking or stripping after machine milking is practised.

Conclusions

Staphylococcus aureus is commonly present in the milk or on the surface of the teats of normal dairy cows; the carriage is generally of an intermittent type with the exception of occasional persistent carriers, and such infection can persist over a period of months without producing mastitis.

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Diet and Canine Hysteria

EXPERIMENTAL PRODUCTION BY TREATED FLOUR*†

by

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During the past 20 years or more dog-owners in this country and in the U.S.A. have been troubled by sporadic outbreaks of a nervous disorder which has been called canine hysteria, running fits, or fright disease. The condition seems to have been noted first in the southern States of the U.S.A. about 1916 and in England about 1924, and to have increased in intensity and distribution since then. Much has been written on the subject, and the disorder has at one time or another been ascribed to many causes. These include internal and external parasites; deficiency of certain food factors, especially vitamins B_1 and A; deficiency of an amino-acid such as lysine; excess of proteins; allergy to food constituents and other substances such as pollen; toxicity of flour from the Far East; yeast; meat and the method of cooking it; botulism; infection of a virus type or a complication of distemper; and, finally, heredity. In recent years, however, the majority of writers seem to have agreed that (1) food is the causal agent, though there is no agreement as to whether the trouble is due to a deficiency in the food or to a toxic agent; (2) dog-biscuits and proprietary foods are often implicated; (3) a wheat product is the most likely causal agent in the dog food, including the biscuits; and (4) excitement and physical strain influence the onset and frequency of the attacks.

Canine hysteria up to 1936 has been reviewed and discussed by Hewetson (1936); here, therefore, reference will be confined to some of the experimental investigations on the subject since that date. Melnick & Cowgill (1937) produced convulsive reactions in six adult dogs on diets in which gliadin was the sole protein and furnished 16 per cent. or more of the calorie intake. They also suggested that the toxicity of these high-gliadin diets might be due to protein sensitization. Arnold & Elvehjem (1939) found that a dog food made of wheat flour and meat scrap processed by dry heat caused fits in young dogs, which could be alleviated or prevented by adding to the ration a sufficient amount of unheated protein or protein-containing foodstuff. They thought that a lysine deficiency was involved. Later, however, the subject was again investigated by Wagner & Elvehjem (1944) in consequence of an unpublished observation by Parry ¶ that commercial wheat gluten produced symptoms of hysteria in dogs with great rapidity and intensity. They confirmed Parry's observation and suggested that the disease was caused by some toxic factor in the wheat products and not, as the 1939 work had suggested, by a deficiency of lysine. Further, they stated that the attacks were not prevented by vitamin A, vitamin B_1, hydrochloric acid, casein, or casein hydrolysate.

Canine Hysteria as Observed in this Laboratory

Although there is general agreement among writers as to the signs of the disease and the behaviour of the affected animals, it is possible that canine hysteria has been occasionally mistaken for and even superimposed on such conditions as vitamin A or vitamin B complex deficiency. It may be said at once that in the work to be described no such complication could occur, since the animals always received ample amounts of yeast and vitamin A, except in a few experiments devised to test the effect of vitamin A deficiency on canine hysteria.

The actual observed state of the affected animals in the course of the work will now be given. Apart from the periods of the so-called "attacks," dogs subject to hysteria can usually be recognized by their general demeanour. As compared with normal dogs of the same litter, they tend (1) to be less interested in their surroundings; (2) to run or walk more slowly; (3) to lift their forelegs high when walking and to bounce along when running; (4) to have dry mouths; (5) to stand in a shady corner if the sun is shining and to resist persuasion to run about; and (6) to be less friendly and more frightened. Although the most severe attacks may develop suddenly, the above abnormalities are usually seen for some days before the onset of hysterical outbursts; the actual attacks seem to represent temporary exacerbations superimposed on a chronic abnormal condition.

Once having had fits, a dog will usually continue to suffer intermittent attacks until the diet is changed. The attacks may recur at intervals of several days or a number of fits of varying intensity may develop in one day; they tend to be induced by any sudden stimulus, nervous strain, or change of environment; even bringing susceptible dogs from an outside run to an indoor kennel often precipitates the attacks, as does moving the animals from their usual room to a warmer one. Lactating bitches appear to be particularly prone to hysterical fits.

If the harmful diet is continued for some months the fits may be reduced in number or even stop, but the animal's general behaviour remains abnormal, as described above. A time may come, however, when a dog which seems to be acquiring immunity suddenly suffers the most severe epileptiform fits and dies.

Attacks vary from what is called slight hysteria to true epileptiform fits. In *slight hysteria* the animal has a frightened look, and usually stands with either fore or hind legs rather apart and ears back. Jerking of the head backwards may be seen. At this stage the animal will sometimes shake itself, take a drink of water, and then recover. Often the attacks begin as above, after which the dog rushes across the cage or run, but after dashing into the wall sits down, quiet and dejected-looking, and then slowly recovers. This is recorded as *hysteria*. In more severe cases the animal sits in a sphinx-like posture; its head soon starts jerking, and the movement spreads throughout the body. Next it starts running round and round its cage, sometimes barking furiously, and either dashes into the walls, apparently without seeing them, or attempts to jump up them, overturning food dishes and water-pots, and getting both itself and its cage into a filthy condition. It may begin to recover at this stage, stop running, and stagger around like a drunken person. It will sit down, looking very miserable, but at the end of about 30 minutes may be more or less normal. This is recorded as a *hysterical fit*.

If the dog does not recover at this stage it goes on running, froths at the mouth, usually howls, and collapses. Even then it still moves its legs with a running movement. Finally, this movement ceases and the animal remains still, with rather deep breathing. After a varied time—five to 30 minutes—which appears to bear a relation to the severity of the fit, it recovers consciousness, gets up, and staggers around with marked ataxia; then follow the recovery stages outlined for a hysterical fit. This is recorded as a true *epileptiform fit*. If the animal does not recover consciousness within about 30 minutes it usually dies, although it may remain in an unconscious state for anything up to 36 hours.

Basis of Present Investigation

By 1931 the idea had developed in this laboratory that outbreaks of hysteria were due to the bread portion of the diet, and, since that time, when any such outbreak has occurred the source of the bread supply has often been changed and the fits have usually ceased. Another method adopted empirically, and because we had never seen a dog develop this hysterical condition when oatmeal formed the major part of the diet, was to replace a half or more of the bread by oatmeal, and this was also effective in stopping the outbreak. Samples of the flour from which the suspected breads had been made were obtained for inspection, and thanks are due to a number of bakeries for help in this connection.

During the period of the war it became necessary to obtain supplies of flour of known extraction and composition for experiments on nutrition, and the Cereal Division of the Ministry of Food arranged that these supplies should be prepared at one mill. The miller responsible for the production of the flour often kindly brought it in person to the laboratory, and it was natural to tell him that we suspected some flours of being responsible for outbreaks of canine hysteria and thought a bleaching or improving process might be doing the harm. He asked to be shown samples

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* Preliminary report.

† Reprinted from *The British Medical Journal*, December 14th, 1946, pp. 885-887, by permission of the author and the Editor.

¶ H. B. Parry, B.A. (Cantab.), M.R.C.V.S, Commonwealth Fund Fellow (1938-40), University of Wisconsin; present address Biological Laboratories, Imperial Chemical Industries, Morley, Wilmslow. These observations were made while carrying out experiments on production of hysteria in dogs with purified diets. (This was referred to briefly by Parry—see Suppl. to *The Veterinary Record*, August 17th, 1946, page 86:

"Mr. Parry replied that he had been able to produce hysteria experimentally in 48 hours on a diet with a high percentage of wheat protein. It was not a vitamin B complex deficiency; much of the American literature on the vitamin B complex and this disease was quite unreliable.

Experimentally the syndrome showed certain definite stages:—

1. Prodromal anxiety—the animal stood with its tail between its legs and ears laid back.

2. The hysterical outburst elicited by a sudden noise, sight of some object which might take the form of one or other or both of the following: epileptiform convulsion; running and barking.

The experimental disease could be controlled completely within 24 hours by changing the diet.")

of the flours, and immediately on seeing them said that all had been heavily bleached and probably improved.

The following are the chemical agents in use for bleaching and improving flour (Lockwood, 1945; Smith, 1944):—

Bleachers.—Nitrogen peroxide (gas); benzoyl peroxide (powder).

Improvers.—Ammonium persulphate (powder); potassium persulphate (powder); potassium bromate (powder); acid calcium phosphate (powder).

Combined Bleachers and Improvers.—Chlorine (gas); chlorine and nitrosyl chloride (beta gas); nitrogen trichloride (agene) (gas); chlorine dioxide (addage) (gas).

Thus there seemed a large choice from which to pick out the hypothetical offending agent. However, in discussing the matter further with the miller, the possible implication of wheat protein as the aetiological factor in canine hysteria was mentioned, reference being made to the results obtained by Melnick & Cowgill on gliadin and by Wagner & Elvehjem on wheat gluten respectively. Thereupon he said it was well known that the agene process, in which NCl_3 gas was used, affected the gluten of flour, and that this method of improving flour was used very extensively. On being challenged on this point he said he would not be surprised if as much as 90 per cent. of flour milled in this country and used for bread-making was "agenized." He was therefore asked to supply this laboratory with agenized flour and an equal amount of untreated flour from the same grist so that the hypothesis could be experimentally tested. These are the flours described in this paper as treated (agenized) and untreated (no agene).

Agene is said to consist of approximately 1 per cent. nitrogen trichloride in air saturated with water-vapour. The gas is generated by bringing together chlorine, water, and ammonium chloride, and is removed from the solution by aeration; the air and gas are then brought into intimate contact with the flour in an agitator. The amount of agene used in any operation can be closely controlled and depends largely on the extraction rate of the flour or on the particular portion of the wheat berry milled.

Experimental Results

The flours were tested by feeding young dogs of the same litter on treated and untreated samples. The diet used was one known to be adequate and compatible with normal growth and health provided untreated flour or oatmeal was used as the cereal. It consisted of: separated milk powder, 20 grammes; cereal, 50 to 340 grammes; lean meat, 15 grammes; peanut oil, 10 ml.; bakers' yeast, 5 per cent. of the cereal; ascorbic acid, 5 mg.; NaCl, 1 to 2 grammes; vitamin A, 2,000 or 3,000 i.u.; and vitamin D_3, 200 i.u. The cereal of the diet was cooked in a steamer for 90 minutes at a pressure of 0·5 lb.

It soon became evident that the hysterical outbreaks could often be produced by the above diet if it contained the treated flour but not if it contained the untreated flour. In young puppies the attacks came on insidiously and usually took some weeks to develop. In older growing animals, whose appetites were larger, it was often possible to produce the condition more quickly—sometimes after a fortnight or less of feeding on a diet which included agenized flour. The degree of susceptibility varied from litter to litter and even from animal to animal in the same litter. Changing the flour in the diet of a badly affected animal to the untreated variety resulted in a sudden stoppage of the fits, but the animal might remain nervous and shy for a period.

Tables I to III show the effect of the treated (agenized) as against the untreated flour in regard to the number of hysterical attacks and fits produced in the animals. Attacks of slight hysteria have not been tabulated, but these were numerous in the animals receiving treated flour and were never seen in those having untreated flour. All the attacks recorded were observed, except those in the column headed "probable fits," which were deduced from the condition of the animal and its cage after periods when observation was not continuous. Many of these so-called "probable" fits were without doubt severe hysterical fits, for both animals and cages were filthy, water-pots and food dishes were overturned, and sawdust scattered, as was the case after observed fits. The cages of the animals receiving treated flour were often found in this condition in the early morning, suggesting that the night may be a common time for the attacks; but since the severity of an attack could not be judged solely from the state of the cage after a lapse of possibly several hours, these hypothetical fits have not been included in the tables.

It is seen from Table I that during the first period of 24 weeks dog 3175, receiving untreated flour, had no hysteria or fits, while 3177, which received the treated flour, had 30 attacks of various kinds. During the second period, lasting 12 weeks, when the types of flour were reversed, dog 3175 suffered from 24 attacks and 3177 had none.

Table I

Dog No.	Type of flour	Time to first attack	Hysteria	Hysterical fits	Epileptiform fits	Probable fits	Total
		1st period (24 weeks)					
3175	Untreated		0	0	0	0	0
3176*	Treated	4 weeks	0	10	5	5	20
3177	"	4 weeks	9	10	6	5	30
		2nd period (12 weeks)—Flour reversed					
3178	Treated	1 week	15	6	1	2	24
3179	Untreated		0	0	0	0	0

* Died after six weeks on diet after having continuous epileptiform fits for two days.

Table II

Dog No.	Type of flour	Time to first attack	Hysteria	Hysterical fits	Epileptiform fits	Probable fits	Total
3187*	Treated	4 weeks	5	7	3	1	16
3188	"	4 "	4	9	0	4	17
3189	Untreated	—	0	0	0	0	0
3190†	Treated	4 weeks	4	13	6	4	27
3191	"	4 "	5	11	2	3	21
3192	Untreated (1st 15 weeks	—	0	0	0	0	0
	Treated (8 weeks)	2 weeks	2	2	0	1	5

* Died after 23 weeks on diet after having a severe epileptiform fit.
† Died after 15 weeks on diet after having continuous epileptiform fits for 36 hours.

Table II also shows how definite is the effect of the agenized flour. The one dog of the litter having the untreated cereal throughout, No. 3189, had no hysterical bouts or fits during the experimental period of 22 weeks, whereas the four having treated flour all the time had attacks varying in severity and ranging in number from 16 to 27 during this period. The last of the series, No. 3192, whose diet was changed in the course of the experiment, had no fits during the 15 weeks it received untreated flour, but two weeks after the substitution of treated (agenized) flour the attacks started, and it had five of them.

Vitamin A Deficiency and Canine Hysteria

Canine hysteria can be superimposed on vitamin A deficiency when animals have a diet deficient in vitamin A and containing agenized flour. Examples are seen in Table III, which shows the results of an experiment made on four dogs of the same litter, two of which had the basal diet described above, containing 2,000 i.u. of vitamin A daily, and the other two had the same diet with the omission of the vitamin. No hysteria or fits developed in any of the dogs during the 15 weeks when untreated flour was given, whether vitamin A was included in the diet or not. In the second period treated (agenized) flour was substituted for the untreated type in each case, and all four animals suffered to some extent from hysteria or fits, though the vitamin A content of the diet remained the same as during the first period. After ten days on this diet untreated flour was again given to two of the animals—Nos. 3203 and 3205—the first being vitamin-A-deficient and the other normal. The flour has now been changed for one month, but, except during the first day, neither dog has had any form of fit, and, though not yet fully recovered, they have had no outburst which could be rated even as slight hysteria.

Table III

Dog No.	Vitamin A in diet	Type of flour	General condition of animal	Hysteria and fits
		1st period (15 weeks)		
3201	— A	Untreated	Definite A deficiency	None
3202	+ A	"	Normal	"
3203	— A	"	Definite A deficiency	"
3205	+ A	"	Normal	"
		2nd period (10 days)		
3201	— A	Treated	Definite A deficiency	Slight hysteria
3202	+ A	"	Normal	4 hysterical fits
3203	— A	"	Definite A deficiency	8 severe epileptiform fits
3205	+ A	"	Normal	4 " " "

Discussion

The results of this investigation show that the practice of bleaching and improving flour by NCl_3, known as the agene pro-

cess, is responsible for a flour which produces canine hysteria under the conditions described above. The evidence is of a direct kind, the abnormality being produced by diets containing the treated flour, samples of the same flour untreated being harmless. Substitution of the treated flour by the untreated type tends to reverse the animal's condition and allows complete recovery from the hysteria and fits, even though the animal itself may not be normal. Recovery from the slighter but more chronic condition appears to bear a relationship to the length of time the animals have received the treated flour. If they have had it for a long period—*e.g.*, six months—recovery may not be complete even after three to four months on the untreated flour, although the more severe abnormalities, such as hysterical and epileptiform fits, will cease within 24 to 48 hours of the change of diet.

In this connection the Report of the Departmental Committee on the Treatment of Flour with Chemical Substances (1927) states: "An obvious method of investigating the presence of harmful compounds or suspected impairment of nutritive properties is by feeding experiments with animals. When such experiments give positive results they are conclusive, but negative results cannot be regarded as innocuous." The results described in this paper are of the positive kind referred to in this statement. It is, however, of interest to note that during the course of the present work feeding experiments on rats with agenized flour were negative, just as similar experiments referred to in the report of the Departmental Committee on feeding rats with flour treated commercially with chlorine and nitrogen trichloride were "inconclusive."

It is agreed by experts in milling practice that the agene process affects the gluten of flour particularly. In the above-mentioned report it is stated that "chlorine can act energetically upon gluten, and that the nature of the reaction includes the entrance of chlorine into such important parts of the gluten complex as the tyrosin and tryptophane groupings"; and, later, that "our observations upon chlorine apply also to nitrogen trichloride" and "evidence has been given that its action [*i.e.*, that of NCl_3] on the protein of flour is probably similar to what we have already described in the case of chlorine." No experiments have been made in the present work with flour bleached and improved by chlorine.

These statements from the report, written nearly 20 years ago, taken in conjunction with the results obtained in the present work showing the toxic effect of agenized flour, must be considered in relation to the work of Melnick & Cowgill (1937), of Parry, and of Wagner & Elvehjem (1944), referred to earlier, and it would be a matter of interest to know whether the gliadin and gluten used by the U.S.A. workers were prepared from agenized flour. It is believed that this process of improving flour is, or has been, as popular in the U.S.A. as in this country, so it is not unlikely that the proteins used by the U.S.A. workers were prepared from agenized or similarly treated flours. Obviously the next test to be made in regard to canine hysteria was to compare the effects of wheat gluten made from untreated and agenized flour respectively, and this is now being done.

When the idea of testing the effect of agenized as against untreated flour was first mooted the point was raised that, though proprietary dog-biscuits were said to be associated with canine hysteria, it seemed unlikely that the flour used in such biscuits would be agenized. The miller, however, said that although flour intended solely for dog-biscuits would not usually be subjected to an improving process, a long-extraction flour which had been so treated was, in fact, often used in their manufacture. Indeed, he regarded this fact as supporting the idea that agenizing might well hold the solution to the problem of the observed hysterical attacks and account for the variations in reports implicating dog-biscuits.

The agenized flours used in this investigation were not specially prepared overbleached specimens, but, according to our miller friend, were all subjected to a normal commercial bleach. At different times the extraction rate of the flours has varied between 80 and 90 per cent. Some batches have had no added calcium and others have had the normal statutory additions prescribed for 85 and 90 per cent. extraction flours, but all, irrespective of calcium content or extraction rate, have given the same results so far as canine hysteria is concerned. It is possible to increase the bleach in order to camouflage a clumsy separation in the mill. It is likely that such a flour would be even more powerful in producing the hysterical condition here described.

The abnormal behaviour of the animals affected by the agenized flour suggests that the central nervous system is primarily affected by some toxic agent, but other organs may also be involved. A few dogs have died in these attacks, but ordinary *post-mortem* examination has not yet revealed any lesion which can be regarded as the essential one. It is clear that investigations must now be made to see whether human beings are affected by bread made from flour improved by NCl_3.

Summary

Canine hysteria, sometimes called running fits or fright disease, a nervous condition which has troubled dog-owners both in this country and in the U.S.A. for the past 20 years or so, has been produced in growing dogs by including in their diet flour that has been improved and bleached by NCl_3, the agene process. The same flour when untreated did not produce the nervous malady. Affected dogs returned towards normal and the typical hysteria and fits stopped when the agenized flour was removed from the diet and replaced by unimproved flour of the same grist.

Warm thanks are due to the miller mentioned above, who wishes to remain anonymous, for the help he has given in this work. Not only did he supply with promptness and great care the specimens of flour needed for the research, but he also placed his specialist knowledge as a scientific miller at our disposal and so made the investigation possible. I wish also to thank members of the staff of the laboratory, especially Mr. R. J. C. Stewart, for their help and zeal in this work.

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"THE MENACE OF BLEACHED FLOUR"

The British Medical Journal devoted the first editorial article of its issue of December 14th, containing Sir Edward Mellanby's preliminary report, to consideration of its subject under the heading "The Menace of Bleached Flour," as follows:—

One of the most remarkable developments in the long struggle for wholesome and nutritious bread is reported by Sir Edward Mellanby at page 885 of this issue. In his laboratory dogs given a diet consisting largely of flour which had been bleached by the "agene" process invariably developed hysteria. Control animals fed upon the same diet but with unbleached flour remained free from this syndrome. For about 20 years canine hysteria has presented a problem which is as interesting to the pathologist as it is distressing to the dog-owner. Those familiar with the dog's side-long glances at some unseen terror, the frightened barking, and the aimless rushing round which precedes exhaustion will appreciate the accuracy of Mellanby's description. Various authorities have ascribed this condition to factors as diverse as the after-effects of distemper, worms, ticks, or even a perverted appetite for gravel. For some time, however, enlightened veterinarians have concluded that more often than not hysteria in dogs is nutritional in origin.

It has long been known that certain wheat products are liable to cause this hysteria. Dog-biscuits and meals manufactured under excessive exposure to heat have been especially suspect. There has been difficulty, however, in deciding whether the trouble was due to a toxic factor or to deficiency of some essential nutrient. Melnick & Cowgill[1] found that their dogs had hysteria when given diets containing gliadin, the alcohol-soluble fraction of wheat gluten, and they considered that protein sensitization was involved. Arnold & Elvehjem[2] thought that the syndrome was attributable to deficiency of the amino-acid lysine, though Wagner & Elvehjem[3] later discarded his view in favour of the theory of a toxic agent. Mellanby's new finding seems to indicate that the toxic substance is not present in the natural wheat but is formed by the action of the bleaching agent, which in the "agene" process is nitrogen trichloride. This and other processes have been widely used here and in America to bleach flour and improve its baking qualities. It is therefore likely that wheat products found to be toxic by previous workers have been submitted to similar treatment.

Attempts to elucidate the nature of the toxic substances are being made. Mellanby intends to find out, and it will be of crucial importance to know, whether wheat gluten, like flour, acquires toxicity only after bleaching. Meanwhile it is interesting to speculate on the possible mechanisms by which such a trustworthy food as wheat can become poisonous. The most important constituent of wheat gluten is glutamic acid, which makes up as much as 43 per cent. of the total amino-acid content. There seems little reason to suspect injury from this direction. Indeed, Price, Waelsch & Putman[4] have claimed that *dl*-glutamic acid hydrochloride is a useful drug in the treatment of patients suffering from petit mal and psychomotor seizures. As Mellanby has pointed out, however, chlorine may act upon the tyrosin and tryptophane groupings of the gluten complex, and it is possible to visualize the formation of toxic bodies in this way. Kodicek, Carpenter & Harris,[5] for example, have shown recently that indole-3-acetic acid (hetero-auxin), a substance related to tryptophane, may in certain circumstances have an adverse action on rats.

Mellanby's observations have been confined to the effects of the bleached whole flour. If the American work on the toxic properties of wheat gluten were unknown it might well have been assumed that these effects were due to the destruction of vitamins. Vitamins are present in such minute amounts that in many instances they are selectively attacked by the relatively small amounts of chlorine used in bleaching. They therefore suffer far greater damage than would be the case if the chlorine distributed its action evenly over all the components of the flour. In particular it might have been thought that the hysteria resulted from a destruction of adermin (vitamin B_6). Chick, El Sadr & Worden[4] found that rats deprived of this factor developed epileptiform fits which were obviously very similar to hysteria in dogs. Wagner & Elvehjem were unsuccessful in a single attempt to prevent hysteria by giving vitamin B_6, and Mellanby's dogs developed hysteria even though their diet contained yeast, a rich source of this vitamin. Against these findings we may place the experience of some veterinarians, who find that hysteria is often amenable to treatment with yeast. While awaiting further experimental developments it may be premature to exclude completely the possibility of dietary deficiency. Even if it is proved that wheat gluten becomes toxic after bleaching it is still possible that it may exert its injurious action by interfering with the absorption or metabolism of adermin. For this hypothesis we have a parallel in the work of Boas[5] on the increased demand for biotin in rats given avidin in the form of unboiled egg white.

Whatever the true explanation of the action of bleached flour may be, it is clearly undesirable that food unfit for dogs should be eaten by the human subject without at least a full realization of the dangers involved. Perhaps some comfort may be drawn from the different response to wheat products shown by different species. Wagner & Elvehjem were unable to detect fits in rats, guinea-pigs, monkeys, and chicks feeding on sufficient wheat gluten to cause hysteria in dogs. As yet we have little, if any, evidence that diet is a significant factor in human epileptiform fits, and the consumption of large quantities of bread made from bleached flour is obviously not inconsistent with the maintenance of an ordinary state of health in most people. All will agree, however, with Mellanby's statement that carefully planned experiments with human volunteers are now required. Until such experiments have been completed the estimate that 90 per cent. of the flour consumed in this country is "agenized" cannot fail to give rise to some anxiety.

References

[1] *J. Nutrit.*, 1937, **13**, 401.
[2] *J. Amer. vet. med. Ass.*, 1939, **95**, 303.
[3] *J. Nutrit.*, 1944, **28**, 431.
[4] *J. Amer. med. Ass.*, 1943, **122**, 1153.
[5] *Lancet*, 1946, **2**, 491.
[6] *Biochem. J.*, 1940, **34**, 595.
[7] *Ibid.*, 1927, **21**, 712.

BRITISH COMMONWEALTH AND EMPIRE HEALTH AND TUBERCULOSIS CONFERENCE, 1947

A Conference on Tuberculosis, arranged by the National Association for the Prevention of Tuberculosis of Great Britain, will be held in London on July 8th, 9th and 10th, 1947. The Conference will deal with tuberculosis in all its aspects, but with special reference to the problem as affecting the British Commonwealth, and representatives from all the Dominions and Colonies have been invited.

The sessions will include discussions on tuberculosis in the British Commonwealth and the Colonial Tuberculosis Services; Sanatorium design; after-care and rehabilitation; the psychology of tuberculosis; new discoveries in the prevention and treatment of the disease, and the National Health Service and its effect on tuberculosis schemes.

Plans are being made for overseas guests to see something of the anti-tuberculosis work for which Great Britain is famous, and will include visits to sanatoria, hospitals and clinics, and demonstrations of various kinds. The Conference is open to doctors, veterinarians and laymen, and fuller particulars can be obtained from the Secretary-General, National Association for the Prevention of Tuberculosis, Tavistock House North, Tavistock Square, London, W.C.1.

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Weekly Wisdom

Let us possess our own souls, unswayed by the shouts of the crowd; let us keep our ideals quietly and hand them on to others.—Han Suyin, "Destination Chung-king."

ABSTRACTS

[The Estimation of Penicillin in Blood Serum and Milk of Bovines after Intramuscular Injection. Watts, P. S., & McLeod, D. H. (1946.) *J. comp. Path.* **56**. 170-179.]

The sensitivity to penicillin of 56 strains of *Str. agalactiae* and four of *Staph. aureus* isolated from cases of bovine mastitis was tested in litmus milk and found to be of the same order as that of the Oxford Staphylococcus (0·02 unit per ml. Fresh bovine serum contains a factor possessing anti-penicillin activity which is destroyed by heating at 56° C. for 30 minutes and is different from the factor in serum which inhibits the action of sulphanilamide. Heating milk to 100° C. for 30 minutes does not affect its content of penicillin and has the advantage of destroying bacterial contaminants.

Intramuscular injection of 500,000 and 1,000,000 units of penicillin in cows was followed by concentrations of the drug in the serum which were greatest 30 minutes after injection and persisted for twice as long in the animals receiving the larger dose. Penicillin could not be detected in the milk of any of the eight cows used: this observation suggests that intramuscular injection of the drug is unlikely to be of value in the treatment of mastitis.

S. J. E.

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[A Peculiar Infection with Acid-fast Bacteria in Wood-Pigeons (*Columba palumbus L.*) Christiansen, M., Ottosen, H. E., & Plum, N. *Skand. Vet-Tidskr.* **36**. No. 6. 352-369.]

A spontaneous infection with acid-fast bacteria in wood-pigeons is described. The infection was found accidentally in five birds sent to the State Veterinary Serum Laboratory in Copenhagen from various parts of Denmark. Later, in a systematic investigation, 230 wood-pigeons were examined and in 13 (5·7 per cent.) of these infection was detected. The organisms resembled tubercle bacilli morphologically but failed to grow on culture media. From five of the 230 birds, where microscopic examination had shown no acid-fast bacteria, cultures showed growth of avian tubercle bacilli.

Confirmatory biological tests using domestic pigeons, poultry and rabbits further showed that the infecting organism could not be recovered although injection was succeeded by pathological changes resembling that of tuberculosis.

Macroscopic and microscopic examination of lesions of affected pigeons showed a resemblance to those of tuberculosis. The lesions were usually confined to the spleen and liver where a productive inflammatory reaction with development of epithelioid and giant cells was in evidence.

S. J. E.

COMMONWEALTH MEDICAL SCIENCE COMMITTEE

The report has just been published of an important conference held in June and July of last year and attended by scientists from all parts of the British Commonwealth (Stationery Office, Cmd. 6970. Pp. 73, 1s. 3d.). Its terms of reference were wide—"To consider the best means of ensuring the fullest possible collaboration between civil government scientific organizations of the Commonwealth and to make formal recommendations for the approval of the Governments represented." All aspects of scientific thought were represented, and, says *The Pharmaceutical Journal*, one of its immediate actions was to set up a medical science committee under the chairmanship of Sir Edward Mellanby, who is secretary of the Medical Research Council. This Committee made a number of recommendations, the most important being one which called for the establishment in each Dominion of a Government-sponsored body to be charged with the responsibility of stimulating, supporting, and organizing medical research. The Committee also gave support to recommendations of the Royal Society's Empire Conference held simultaneously in London, which have as their object a development of our knowledge of the ecology of infectious diseases, the treatment of vitamin and mineral deficiency diseases, and the production of greater supplies of insulin to meet its demand "on an increasing scale" for the treatment of diabetes. Moreover, a subject recommended for discussion by the Indian legation is the establishment of properly organized machinery for collaboration with various centres of medical research in the United Kingdom, with particular reference to medicinal and insecticidal plants.

N.V.M.A ANNUAL CONGRESS, 1947

LIST OF HOTELS, ETC., IN EDINBURGH AND SURROUNDING DISTRICTS

It has been decided to hold the 1947 Congress in Edinburgh from July 28th to August 1st inclusive. It is desirable that applications for accommodation should be made as early as possible as hotels and boarding-houses are already booking for next summer.

If any members fail to obtain suitable accommodation they should get in touch with the Hon. Local Secretary, Professor A. Robertson, Royal (Dick) Veterinary College, Edinburgh 9, who will endeavour to assist them.

Name and Address of Hotel	Terms per Week	Terms per Day
Licensed		
Braid Hills Hotel, Edinburgh	7–8 gns.	—
Caledonian Hotel, Princes St., Edinburgh	9½–12½ gns.	—
Cockburn Hotel, Edinburgh	6 gns.	—
George Hotel, 21, George St., Edinburgh	—	£1/0/6–£1/2/6
Harp Hotel, Corstorphine, Edinburgh	6 gns.	—
Imperial Hotel, 143, Leith St., Edinburgh	6 gns.	—
North British Station Hotel, Princes St., Edinburgh	—	25/– – 28/6
Queen Hotel, Edinburgh	7–8 gns.	—
Roxburghe Hotel, Charlotte Sq., Edinburgh	—	27/–
Royal British Hotel, 20, Princes St., Edinburgh	8 gns.	—
•Rutland Hotel, 3, Rutland St., Edinburgh	—	12/6–18/6
Unlicensed		
Abercromby Hotel, Edinburgh	4½–5½ gns.	—
Afton Hotel, Grosvenor Cres., Edinburgh	£6/9/6–7 gns.	—
Alexander Hotel, 1, Hunter Sq., Edinburgh	£3/10–£4	—
Alison Hotel, 1, Melville Cres., Edinburgh 3	5–8 gns.	—
Annorma House Hotel, 8, Nile Grove, Edinburgh 10	6 gns.	—
Bellevue Private Hotel, 13, Inverleith Row, Edinburgh 4	4–5 gns.	—
Blair Atholl Hotel, 10, Grosvenor Sq., Edinburgh 12	4½–5½ gns.	—
Carahane Hotel, 1, Peel Ter., Newington, Edinburgh 9	7–10 gns.	—
Carlton Private Hotel, Edinburgh	5 gns.	—
Chimes Hotel, 3, Royal Ter., Edinburgh	6 gns.	—
Clifton Hotel, 53, Promenade, Portobello, Edinburgh	4½–6 gns.	—
Crown Hotel, Torphichen St., Edinburgh	5 gns.	—
Darlings Regent Hotel, 21, Waterloo Pl., Edinburgh	£7/14	—
Donmaree Hotel, 21, Mayfield Gardens, Newington, Edinburgh 9	7–8 gns.	—
Edward Hotel, 57, Gt. King St., Edinburgh	5 gns.	—
Ettrick Private Hotel, Edinburgh	5–6 gns.	—
Gloucester Hotel, Gloucester Pl., Edinburgh	4½–5½ gns.	—
Gordon Hotel, 7, Royal Circus, Edinburgh 3	3½–6 gns.	—
Grange Hotel, 10, Chalmers Cres., Edinburgh	£3/10–4 gns.	—
Green's Hotel, Eglinton Cres., Edinburgh	5½–7 gns.	—
Halcyon Hotel, 8, Royal Ter., Edinburgh	5½ gns.	—
Haymarket Hotel, 1, Coates Gdns., Edinburgh	4 gns.	—
Holme Hotel, 12, Royal Circus, Edinburgh 3	3½–5 gns.	—
Iona Private Hotel, Strathearn Pl., Edinburgh	5 gns.	—
Janette Hotel, 9, Royal Ter., Edinburgh	5 gns.	—
Lea Private Hotel, 69, Leamington Ter., Edinburgh	5 gns.	—
Leamington Hotel, Leamington Ter., Edinburgh 10	7 gns.–£8/15	—
†Magdala Hotel, 4, Magdala Cres., Edinburgh 12	—	7/6–8/6
Maitland Hotel, 33, Shandwick Pl., Edinburgh	5–6 gns.	—
Mayfield Private Hotel, 15, Mayfield Gdns., Edinburgh 9	5½–6 gns.	—
Melrose Private Hotel, 47, Minto St., Edinburgh	4½ gns.	—
Menzies Hotel, 26, Royal Ter., Edinburgh	5 gns.	—
Palmerston Private Hotel, 56, Palmerston Pl., Edinburgh	—	13/6–15/–
Pirie's Hotel, 6, Coates Gdns., Edinburgh	5 gns.	—
Regent Private Hotel, 6, Regent Ter., Edinburgh 7	3½–4½ gns.	—
Rosslyn Private Hotel, 9, Palmerston Pl., Edinburgh	3½–5 gns.	—
Royal Stuart Hotel, 18, Abercromby Pl., Edinburgh	4½–7 gns.	—
Shelbourne Hotel, Edinburgh	£6/9/6	
St. Alban's Hotel, 9, Rutland Sq., Edinburgh	£4/14–£5/10	
St. Andrew Hotel, 8, South St., Andrew St., Edinburgh 2	£6/2/6–7 gns.	—
Suttie's Hotel, Edinburgh	6 gns.	—
Terrace Hotel, Edinburgh	5 gns.	—
Varrich House Private Hotel, 7, Church Hill, Edinburgh 10	5–6 gns.	—
Boarding Houses		
Greenhill House, 12, Strathearn Pl., Edinburgh	4–5 gns.	—
Learmonth Guest House, 11, South Learmonth Gdns., Edinburgh	—	12/6
Mayflower Board Residence, 15, Glenorchy Ter., Edinburgh 9	—	11/– – 12/–
Richmond House, 20, Leopold Pl., Edinburgh	—	9/– – 10/6
Springbank, 22, Bath St., Portobello, Edinburgh	£3/10	—
Tigh-na-Bruaich, 57, Orchardhead Rd., Liberton, Edinburgh 9	5 gns.	—
West Colinton Guest House, Colinton, Edinburgh 13	5 gns.	—
Hotels EAST LOTHIAN		
Goblin Ha' Hotel, Gifford	5 gns.	—
Bissets Hotel, Gullane	7 gns.	—
Linga Hotel, Gullane	6–7 gns.	—
Queen's Hotel, Gullane	Opening in the Spring—Terms not yet quoted	
Ardrulin Private Hotel, Clifford Rd., N. Berwick	7 gns.	—
County Hotel, High St., N. Berwick	5 gns.	—
Dunedin Lodge, N. Berwick	£6	—
King's Knoll Hotel, Clifford Rd., N. Berwick	7 gns.	—
Marine Hotel, N. Berwick	£9/2/6–£12/12/6	
Royal Hotel, Station Rd., N. Berwick	7–8 gns.	—
Castle Hotel, Dirleton	5 gns.	—
Craig-en-Gelt Hotel, Dunbar	6 gns.	—
George Hotel, Haddington	4 gns.	—
MIDLOTHIAN		
Juniper Lea, Blackshiels	5 gns.	—
Harrow Hotel, Dalkeith	6–7 gns.	—
Orford House Private Hotel, Dalkeith	—	15/– – 18/–
‡Melville Castle, Lasswade	5–7 gns.	—
Royal Hotel, Stow	£4/10	—
WEST LOTHIAN		
Cramond Bridge Hotel, Cramond	4 gns.	—
Hawes Inn, South Queensferry	5½–6 gns.	—
Queensferry Arms Hotel, S. Queensferry	£4/7/6	—
Staghead Hotel, South Queensferry	£7–8 gns.	—
Roadhouse Hotel, Near Whitburn	5½ gns.	—
PEEBLES-SHIRE		
Traquair Arms Hotel, Innerleithen	5–6 gns.	—
Green Tree Hotel, Peebles	£5	—
Tontine Hotel, High St., Peebles	5 gns.	—
Waverley Hotel, High St., Peebles	5 gns.	—
Cross Keys Hotel, Peebles	5 gns.	—
Minden Hotel, Innerleithen Rd., Peebles	5 gns.	—
Romanno Bridge Hotel, Romanno Bridge	£4/10	—

• Meals extra. † Bed and breakfast only. ‡ Opening Mar. 1st.

QUESTIONS IN PARLIAMENT

Animal Experiments (Inspectors)

Sir G. Fox asked the Secretary of State for the Home Department whether inspectors appointed by him under the Cruelty to Animals Act, 1876, are required to have training and experience in respect of scientific method and animal husbandry.

Mr. Ede: From candidates with the medical and scientific qualifications requisite for this work no difficulty has been experienced in selecting inspectors who are fully competent to supervise the care of animals used for experiments.

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Colonial Development Plans (Publication)

Mr. Durbin asked the Secretary of State for the Colonies whether he proposes to make available for the information of Parliament copies of Development Plans published in the Colonies.

Mr. Creech Jones: Yes, Sir. I have caused to be placed in the Library copies of the plans published in Nigeria, Sierra Leone, Kenya, Zanzibar, Cyprus, Mauritius and Tanganyika. I have arranged for copies of further plans for other territories to be placed in the Library when they are published and received here. Members will, of course, appreciate that publication of a plan does not necessarily mean that it has been finally approved, and, furthermore, that these plans even when approved must not be regarded as blueprints to be followed in all details, but as programmes indicating the targets which it will be endeavoured to attain in the various fields of development expenditure. The details will be determined by the actual schemes of development made by me under the Development and Welfare Acts, or provided for by monies voted by the local legislatures from their own resources. The general programmes must be susceptible to review from time to time both centrally and on the spot in association with local opinion and in accordance with the principles laid down by my predecessor in his circular despatch of November 12th, 1945, which was published as Cmd. 6713.

NOTES AND NEWS

Diary of Events

Jan. 15th and 16th—R.C.V.S. Committee Meetings.
Jan. 16th.—Meeting of the Lincolnshire and District Division, N.V.M.A., at Lincoln (Saracen's Head Hotel), 2.15 p.m.
Jan. 17th.—R.C.V.S. Quarterly Meeting of Council.
Jan. 17th.—Meeting of the Sussex Division, N.V.M.A., at Brighton (Old Ship Hotel), 2.30 p.m.
Jan. 17th.—Annual Meeting of the Mid-West Division, N.V.M.A., at Clifton, Bristol (Bright's Café), 2.15 p.m.
July 28th—Aug. 1st.—N.V.M.A. Annual Congress in Edinburgh.

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New Appointments to the Staff of the Ministry of Agriculture

As notified in recent issues, Council, N.V.M.A., has decided that no advertisements for appointments to the veterinary staff of the Animal Health Division of the Ministry of Agriculture shall be accepted for *The Veterinary Record* pending the settlement, in a manner satisfactory to the Association, of the question of the status and salaries of the Veterinary Officers of the Division.

In the meantime, any members of the profession who may, nevertheless, contemplate applying for such posts, should these be advertised elsewhere, are requested first to communicate with the General Secretary of the Association at 36, Gordon Square, London, W.C.1.

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PERSONAL

Appointment.—The Diseases of Animals Committee of the County Council of Ross and Cromarty has appointed Mr. Neil H. Matheson, Larkhall, as veterinary officer in the Highlands and Islands veterinary service scheme, to be stationed at Gairloch.

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Births.—Clark.—On January 2nd, 1947, at Llandrindod Wells, to Janet and H. M. Clark, a son.

Robinson.—On December 22nd, 1946, to Lucy R. Robinson, M.R.C.V.S., a daughter.

* * * * *

Rugby Football.—Reader enthusiasts will be pleased that our International forwards have retained their form this season and so their places. H. W. Deas (Herriot's) played well in Paris at Christmas, though Scotland lost; Michael Steele-Bodger performed brilliantly in the recent trial game, and gains a "cap"—against Wales at Cardiff on January 18th.

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Girl Student's Climbing Accident.—Miss Irene Gross, a veterinary student of Glasgow, narrowly escaped death from exposure after a fall, from which she sustained a leg fracture, when more than half way up Bidean nan Bean, a 3,766 ft. mountain in Glencoe, Argyllshire, during a holiday climb. A young companion stayed with her all night and built a wall of stones and rocks to shelter her from a blizzard. After ten hours a rescue party succeeded in bringing them down, with great difficulty, and Miss Gross was taken to Fort William Hospital in an ambulance that had waited all night at the foot of the mountain.

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UNIVERSITY OF LIVERPOOL, SCHOOL OF VETERINARY SCIENCE

B.V.Sc. Degree Examination Results

Following is the University of Liverpool, School of Veterinary Science, examination list for December, 1946, in connection with the University Degree of B.V.Sc.:—

Final Examination.—*Part I*—Kerr, P. A., Mills, Susan., Penny, R. H. C., Wilkinson, G. T., Willis, G. A.; *Part II*—Mills Susan., Penny, R. H. C., •Wilkinson, G. T., •†Willis, G. A.

• Distinction in Jurisprudence and Practical Toxicology.
† Distinction in Milk Production and Inspection.

Fourth Examination.—Curtis, P. E., Henderson, Jane E., Shepherd, E.

Third Examination.—*Part I*—Aston, K. R., Clark, W. A., Griffiths, L., MacDonald, J. N., Morris, J.; *Part II*—Aston, K. R., Griffiths, L., Macdonald, J. N., Pink, C. E.; *Part III*—Aston, K. R., Clark, W. A., Field, A. C., Greasley, J., Griffiths, L., MacDonald, J. N., Morris, J., Watkins, I. M.

Second Examination.—Bacon, W., Cayless, Barbara G., Davies, E. L., Forster, P. E., Forster, R., Hooper, Geraldene M., Keeble, S. A., Mason, H., Medcalf, Rosemarie I., Morgan, W. J. B., •Parkinson, W. G., Parry, R. T., Perry, P. F., Smith, Marion B., Stevens, A. J., Teer, J., Theobald, C. G., Woodhead, A. T.

• Distinction in General Embryology.

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ADDRESSES OF DISEASE-INFECTED PREMISES

The list given below indicates, first, the county in which are situated the premises on which disease has been confirmed, followed by the postal address and date of outbreak.

Foot-and-Mouth:

Dorset.—Manor Farm, Thornford, Sherborne, Dorset (Dec. 31st): Frankham Farm, Ryme Intrinsica, Sherborne, and No. 6 Dorset County Council, Smallholding, Oborne, Sherborne (Jan. 1st).
Dorset.—North Farm, Bradford Abbas, Sherborne, Dorset (Jan. 3rd).
Dorset.—Burton House Farm, Long Burton, Sherborne, Dorset (Dec. 6th).
Somerset.—Parsonage Farm, West Camel, Yeovil, Somerset, and Lower Wolfdon Farm, North Cadbury, Somerset (Dec. 31st).
Somerset.—Mill Farm, Weston Bampfylde, Sparkford, Yeovil, Somerset (Dec. 5th).

Swine Fever:

Lincs. (*Lindsey*).—Home Yard, Grange-de-Lings, Nettleham, Lincoln (Jan. 3rd).
Northants.— Roe Farm, Cogenhoe, Northampton (Dec. 30th).

Sheep Scab:

Notts.—Robinson's Farm, Cottam, Retford, Notts (Dec. 21st).
Westmorland.—Troutbeck Farm, Troutbeck, Windermere, Westmorland (Jan. 3rd).

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VETERINARY EDUCATIONAL TRUST

Dr. Guillermo V. Garbers, veterinary surgeon to the Buenos Aires Jockey Club, has arrived in England to take up a Fellowship with the Veterinary Educational Trust for a year's experience at the Equine Research Station, and in veterinary work generally. His

particular interest is equine infertility, but he hopes to visit research stations, veterinary schools, and stables (racing and commercial) and practices.

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Somerset County Committee of the Veterinary Educational Trust has co-opted a number of leading cattle, sheep, pig and poultry breeders upon its executive.

East Sussex County branch of the N.F.U. has contributed 25 guineas to the Trust and Messrs Cooper, McDougall and Robertson, Berkhamsted, have sent an extra contribution of £100 towards the expenses incurred by the Cooper Research Fellow, Dr. Sprent, during his visit to America, where he carried out work on parasitism in animals.

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SEVERE OUTBREAK OF EQUINE INFLUENZA IN LONDON

It was reported on Monday last that an outbreak of influenza in London during the week-end was reaching epidemic proportions. There was, indeed, some likelihood of a consequent dislocation of van deliveries during the week.

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DANGERS OF SECRECY IN SCIENCE

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Science could cause wars if not properly handled, and secrecy was a source of irritation to other countries. The withholding of secrets of atomic energy was in a sense a political card. Scientific knowledge had become a kind of weapon. Once shared, it ceased to have political significance. It was necessary that the scientists of different nations should exchange knowledge.

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The immediate need was for still more milk until the shortage was fully met. After that had been achieved we should still need more milk for fresh cream, ice-cream, milk chocolate, and other dairy products. Assuming that demand remained at the present high level, producers of milk could think in terms of an output in England and Wales of not less than 1,500,000,000 gallons annually, or about 40 per cent. above the 1939 level.

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In addition to the County Lists a complete Register containing a list of all accredited breeders and hatcheries for the whole of England and Wales will be published within the next few weeks and may be obtained post free on application to the Poultry Branch of the Ministry at Africa House, Kingsway, London, W.C.2.

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INFRINGEMENT OF COPYRIGHT

Inasmuch as veterinary authors, in common with ourselves, are open to the same victimization, and similarly on occasion suffer it, we feel that our readers will be interested in recent outspoken comments on the indifference shown by some writers, compilers and editors to the observance of what are, after all, the ethical rules of copyright. They appear in that interesting feature, "From Day to Day," of *The Medical Press* (issue December 11th, 1946) and are as follows:

It is not often that medical authors are forced to concern themselves with copyright, but in recent years the infringements by so many persons and agencies have become so numerous and so blatant that it is clear that something will have to be done. Let it be borne in mind that the author, as he sweats and labours over his work, forms the foundation on which all this immense superstructure is built. Sharing the burden with him is his publisher, who has the monopoly of all of the financial risks. Not many medical authors wax fat on royalties nor, indeed, do they expect to, for it is a tradition of our profession that we part with our knowledge gratuitously for the benefit of all. Nor do medical publishers usually find themselves listed as millionaires; indeed, in the best traditions of publishing they frequently make available books which it is uneconomical to produce, out of the profits made on their "best-sellers"—which are not unduly numerous.

HELP YOURSELF !

Their difficulty, however, is the position of these infringers of copyright, of which a veritable herd has now appeared. First of all there

QUESTIONS IN PARLIAMENT

Animal Experiments (Inspectors)

Sir G. Fox asked the Secretary of State for the Home Department whether inspectors appointed by him under the Cruelty to Animals Act, 1876, are required to have training and experience in respect of scientific method and animal husbandry.

Mr. Ede: From candidates with the medical and scientific qualifications requisite for this work no difficulty has been experienced in selecting inspectors who are fully competent to supervise the care of animals used for experiments.

* * * * *

Colonial Development Plans (Publication)

Mr. Durbin asked the Secretary of State for the Colonies whether he proposes to make available for the information of Parliament copies of Development Plans published in the Colonies.

Mr. Creech Jones: Yes, Sir. I have caused to be placed in the Library copies of the plans published in Nigeria, Sierra Leone, Kenya, Zanzibar, Cyprus, Mauritius and Tanganyika. I have arranged for copies of further plans for other territories to be placed in the Library when they are published and received here. Members will, of course, appreciate that publication of a plan does not necessarily mean that it has been finally approved, and, furthermore, that these plans even when approved must not be regarded as blueprints to be followed in all details, but as programmes indicating the targets which it will be endeavoured to attain in the various fields of development expenditure. The details will be determined by the actual schemes of development made by me under the Development and Welfare Acts, or provided for by monies voted by the local legislatures from their own resources. The general programmes must be susceptible to review from time to time both centrally and on the spot in association with local opinion and in accordance with the principles laid down by my predecessor in his circular despatch of November 12th, 1945, which was published as Cmd. 6713.

NOTES AND NEWS

Diary of Events

Jan. 15th and 16th—R.C.V.S. Committee Meetings.
Jan. 16th.—Meeting of the Lincolnshire and District Division, N.V.M.A., at Lincoln (Saracen's Head Hotel), 2.15 p.m.
Jan. 17th.—R.C.V.S. Quarterly Meeting of Council.
Jan. 17th.—Meeting of the Sussex Division, N.V.M.A., at Brighton (Old Ship Hotel), 2.30 p.m.
Jan. 17th.—Annual Meeting of the Mid-West Division, N.V.M.A., at Clifton, Bristol (Bright's Café), 2.15 p.m.
July 28th—Aug. 1st.—N.V.M.A. Annual Congress in Edinburgh.

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New Appointments to the Staff of the Ministry of Agriculture

As notified in recent issues, Council, N.V.M.A., has decided that no advertisements for appointments to the veterinary staff of the Animal Health Division of the Ministry of Agriculture shall be accepted for *The Veterinary Record* pending the settlement, in a manner satisfactory to the Association, of the question of the status and salaries of the Veterinary Officers of the Division.

In the meantime, any members of the profession who may, nevertheless, contemplate applying for such posts, should these be advertised elsewhere, are requested first to communicate with the General Secretary of the Association at 36, Gordon Square, London, W.C.1.

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PERSONAL

Appointment.—The Diseases of Animals Committee of the County Council of Ross and Cromarty has appointed Mr. Neil H. Matheson, Larkhall, as veterinary officer in the Highlands and Islands veterinary service scheme, to be stationed at Gairloch.

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Births.—Clark.—On January 2nd, 1947, at Llandrindod Wells, to Janet and H. M. Clark, a son.

Robinson.—On December 22nd, 1946, to Lucy R. Robinson, M.R.C.V.S., a daughter.

* * * * *

Rugby Football.—Reader enthusiasts will be pleased that our International forwards have retained their form this season and so their places. H. W. Deas (Herriot's) played well in Paris at Christmas, though Scotland lost; Michael Steele-Bodger performed brilliantly in the recent trial game, and gains a "cap"—against Wales at Cardiff on January 18th.

* * * * *

Girl Student's Climbing Accident.—Miss Irene Gross, a veterinary student of Glasgow, narrowly escaped death from exposure after a fall, from which she sustained a leg fracture, when more than half way up Bidean nan Bean, a 3,766 ft. mountain in Glencoe, Argyllshire, during a holiday climb. A young companion stayed with her all night and built a wall of stones and rocks to shelter her from a blizzard. After ten hours a rescue party succeeded in bringing them down, with great difficulty, and Miss Gross was taken to Fort William Hospital in an ambulance that had waited all night at the foot of the mountain.

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UNIVERSITY OF LIVERPOOL, SCHOOL OF VETERINARY SCIENCE

B.V.Sc. Degree Examination Results

Following is the University of Liverpool, School of Veterinary Science, examination list for December, 1946, in connection with the University Degree of B.V.Sc.:—

Final Examination.—*Part I*—Kerr, P. A., Mills, Susan., Penny, R. H. C., Wilkinson, G. T., Willis, G. A.; *Part II*—Mills Susan., Penny, R. H. C., •Wilkinson, G. T., •†Willis, G. A.

• Distinction in Jurisprudence and Practical Toxicology.
† Distinction in Milk Production and Inspection.

Fourth Examination.—Curtis, P. E., Henderson, Jane E., Shepherd, E.

Third Examination.—*Part I*—Aston, K. R., Clark, W. A., Griffiths, L., MacDonald, J. N., Morris, J.; *Part II*—Aston, K. R., Griffiths, L., Macdonald, J. N., Pink, C. E.; *Part III*—Aston, K. R., Clark, W. A., Field, A. C., Greasley, J., Griffiths, L., MacDonald, J. N., Morris, J., Watkins, I. M.

Second Examination.—Bacon, W., Cayless, Barbara G., Davies, E. L., Forster, P. E., Forster, R., Hooper, Geraldene M., Keeble, S. A., Mason, H., Medcalf, Rosemarie I., Morgan, W. J. B., •Parkinson, W. G., Parry, R. T., Perry, P. F., Smith, Marion B., Stevens, A. J., Teer, J., Theobald, C. G., Woodhead, A. T.

• Distinction in General Embryology.

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ADDRESSES OF DISEASE-INFECTED PREMISES

The list given below indicates, first, the county in which are situated the premises on which disease has been confirmed, followed by the postal address and date of outbreak.

Foot-and-Mouth:

Dorset.—Manor Farm, Thornford, Sherborne, Dorset (Dec. 31st): Frankham Farm, Ryme Intrinsica, Sherborne, and No. 6 Dorset County Council, Smallholding, Oborne, Sherborne (Jan. 1st).
Dorset.—North Farm, Bradford Abbas, Sherborne, Dorset (Jan. 3rd).
Dorset.—Burton House Farm, Long Burton, Sherborne, Dorset (Dec. 6th).
Somerset.—Parsonage Farm, West Camel, Yeovil, Somerset, and Lower Wolfdon Farm, North Cadbury, Somerset (Dec. 31st).
Somerset.—Mill Farm, Weston Bampfylde, Sparkford, Yeovil, Somerset (Dec. 5th).

Swine Fever:

Lincs. (*Lindsey*).—Home Yard, Grange-de-Lings, Nettleham, Lincoln (Jan. 3rd).
Northants.— Roe Farm, Cogenhoe, Northampton (Dec. 30th).

Sheep Scab:

Notts.—Robinson's Farm, Cottam, Retford, Notts (Dec. 21st).
Westmorland.—Troutbeck Farm, Troutbeck, Windermere, Westmorland (Jan. 3rd).

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VETERINARY EDUCATIONAL TRUST

Dr. Guillermo V. Garbers, veterinary surgeon to the Buenos Aires Jockey Club, has arrived in England to take up a Fellowship with the Veterinary Educational Trust for a year's experience at the Equine Research Station, and in veterinary work generally. His

particular interest is equine infertility, but he hopes to visit research stations, veterinary schools, and stables (racing and commercial) and practices.

. . . . .

Somerset County Committee of the Veterinary Educational Trust has co-opted a number of leading cattle, sheep, pig and poultry breeders upon its executive.

East Sussex County branch of the N.F.U. has contributed 25 guineas to the Trust and Messrs Cooper, McDougall and Robertson, Berkhamsted, have sent an extra contribution of £100 towards the expenses incurred by the Cooper Research Fellow, Dr. Sprent, during his visit to America, where he carried out work on parasitism in animals.

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SEVERE OUTBREAK OF EQUINE INFLUENZA IN LONDON

It was reported on Monday last that an outbreak of influenza in London during the week-end was reaching epidemic proportions. There was, indeed, some likelihood of a consequent dislocation of van deliveries during the week.

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are the "Digest" journals, which frequently purloin matter from other periodials without reference to, or permission from, the holders of the copyright of the digested material. These journals abound in profitable advertisements. Secondly, there are the abstract journals, a considerable number of which have recently appeared in the medical field. These are similarly often innocent of any acknowledgment of obligation. (One of them recently claimed that its abstracts were so good as to make it unnecessary to consult the original!) Then again there are films, micro-films and filmstrips, lantern slides, mimeographic reproduction of books and articles and the unacknowledged reproduction of illustrations. Recently an author used in his book some hundreds of illustrations from other medical books without as much as a "by your leave"!

The Legal Position

It does not seem to be generally realized by those people who circulate such material in this country without authority or acknowledgment that they lay themselves open to proceedings by the holders of the copyright. The only exceptions are photographs of sculpture or craftsmanship permanently situate in a public place or building, or the use of an epidiascope to throw on the screen an illustration from a copyright book, although if a lecturer were to make a slide of the illustration for use in the same way he would be infringing copyright. It will thus be seen that the number of instances in which the question of copyright does not arise is a very small one. The matter becomes still more important when it is realized that an author may find his work quoted by persons and in circumstances which from his point of view may be, to say the least of it, highly undesirable.

That is not to say that either author or publisher wishes to take up a dog-in-the-manger attitude on the question, but both can be pardoned for insisting on the usages of at least ordinary courtesy in the matter. From the point of view of other scientific periodicals or journals, few authors or publishers object to the reproduction of copyright material provided it is not used without permission, and that when it is used due acknowledgment is made as to the source from which it is taken. When the work of the author or publisher, however, is lifted free, gratis and for nothing to provide the basis for a commercial venture it is a very different matter, and in these cases it is surely only reasonable to demand that payment should be made. Generalized piracy of books and publications is very uncommon in this country, but partial piracy is by no means uncommon and seems to be on the increase. It is high time, therefore, that attention were drawn to the matter, as it is clear that the position ought to be regularized in justice to all those concerned. The matter is a serious one and the issue by the Medical Group of the Publishers Association of a memorandum dealing with the use of copyright material is most timely.

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U.S.A. VETERINARY PUBLIC HEALTH SECTION ESTABLISHED

The North American Veterinarian records that a Veterinary Public Health Section has been established in the States Relations Division of the U.S. Public Health Service, Federal Security Agency, "to conduct demonstration projects in the control of animal diseases communicable to man." The section also will collect epidemiological data pertinent to these diseases. Head of the Section is Dr. James A. Steele, of Michigan, who holds degrees in both veterinary medicine and public health. He will be responsible for developing the demonstration projects and for consultant services to the states in conducting veterinary public health programmes. He and his staff in Washington will act as consultants to the district services of the Public Health Service until the programme has progressed sufficiently to provide the assignment of consultants to each district. His office will also provide special services to state and local health departments at the request of the district offices.

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The *Scottish Farmer* in its issue of December 28th reproduces a pleasing photograph of the splendid five-year-old chestnut thoroughbred mare Border Fairy, recently purchased for 5,100 guineas by Major H. E. Keylock, F.R.C.V.S., of Newmarket, from Mr. Alan P. Innes, of Kelso. This is believed to be a record price for a mare sold out of Scotland. Border Fairy has as sire Precipitation—her dam being Hegemony, by Phalaris, and she is in foal to the National Stud Stallion, Big Game. She was one of the most outstanding young mares shown at Newmarket, and, says the *Scottish Farmer*, many well-known breeders remarked on her wonderful bloom and condition.

The Farming and Poultry Advertisement Control Board say they consider that the use of the word "accredited" to describe poultry stock and/or eggs in advertisements should be confined to those breeders and hatcheries who are in the Ministry of Agriculture's accredited scheme. Advertisers who are not accredited are asked to avoid inclusion of the word in their announcements.—*Farmer and Stock-Breeder.*

CORRESPONDENCE

The views expressed in letters addressed to the Editor represent the personal opinions of the writer only and their publication does not imply endorsement by the N.V.M.A.

Correspondents should write as briefly as possible and letters should not exceed 350 words.

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UNIVERSITY QUALIFYING DEGREE IN VETERINARY SCIENCE

Sir,—My copy of the November 16th issue of *The Veterinary Record* arrived to-day and I am particularly glad to see that Mrs. Smith has raised the question of the qualifying degree in veterinary science to be granted in future by those universities training members of the profession.

So far as I am aware, this point has not been discussed previously. It deserves most careful consideration, since the qualification awarded will be of considerable importance in determining the profession's standing in the eyes of the general public.

It is sweeping to say that an ordinary B.Sc. course occupies "at the most only three years," but few indeed require four and this applies with equal truth to the B.A. granted by most universities.

The award of a B.V.M., B.V.S. or M.V.B. degree to veterinary students on completion of their university training would give them a distinctive qualification, more in keeping with the protracted course of study they are obliged to pursue than the granting of a B.Sc. degree.

As Mrs. Smith suggests, a D.V.M. or V.M.D. should be reserved as the postgraduate qualification for members specializing in medical subjects.

Yours faithfully,

December 16th, 1946. T. M. Leach.

Veterinary Department, Headquarters,
British Military Administration, Eritrea.

DISEASES OF ANIMALS ACTS, 1894 TO 1937, AND AGRICULTURE ACT, 1937 (PART IV).

Summary of Returns of Confirmed Outbreaks of Scheduled (Notifiable) Diseases

Period	Anthrax	Foot-and-mouth	Parasitic Mange*	Sheep Scab	Swine Fever
Nov. 16th to 30th, 1946 ...	5	2	—	5	4
Corresponding period in—					
1945 ...	3	2	—	2	24
1944 ...	7	13	—	8	73
1943 ...	11	2	1	7	20
Total Jan. 1st to Nov. 30th, 1946 ...	87	37	7	90	340
Corresponding period in—					
1945 ...	113	125	6	110	891
1944 ...	170	169	7	214	1,338
1943 ...	264	17	8	202	501

Note.—The figures for the current year are approximate only.
* Excluding outbreaks in Army Horses.

Tuberculosis (Attested Herds) Schemes

The number of Attested Herds, *i.e.*, herds officially certified as free from Tuberculosis as at November 30th, 1946, was as follows:—

England	Wales	Scotland	Total (Great Britain)
6,892	10,198	7,883	24,973